

<b>Brookhaven National Laboratory</b> <b>National Synchrotron Light Source</b>		<b>Number:</b> LS-PPS-0012	<b>Revision:</b> B
		<b>Effective:</b> 12/26/02	<b>Page 1 of 4</b>
<b>Subject: <u>X23A3</u> Radiological Interlock Test</b>			
<b>Prepared/</b> M. Buckley		<b>Approved By:</b> S.Buda	
<b>Approved By:</b>			

\*Approval signatures on file with master copy.

[Revision/Periodic Review Log](#)

Test Reason:	Test Result: <input type="checkbox"/> Passed <input type="checkbox"/> Failed	
	Test Type: <input type="checkbox"/> Full <input type="checkbox"/> Partial	
Test Date:	Start Time:	Finish Time:
Tester 1:	Assistant 1:	
Tester 2:	Assistant 2:	

**PREPARATION:**

Inform control room operator that test will be done.

Turn off 'Red Tag' switch on x-ray ring interlock, and apply LOTO to X-Ray Security system.

Verify that vacuum valves and water interlocks are satisfied on the beam line.

1. Search the hutch

The overhead lights go out

The red interior light comes on

The audible alarm sounds for 13 to 15 seconds minimum

The hutch interlock sign turns on

2. Open hutch door

The hutch interlock sign goes out

3. Press CS-1, close hutch door and wait.

Hutch interior lights come on in not more than 20 seconds.

Press CS-E.

Interlock does not activate

4. Press interior search buttons in order, close door, press CS-E, note that alarm comes on, open and close door, press CS-E again. (This must all be done in less than the timeout interval noted in step 3)

Interlock does not activate

5. Open photon shutter. Search hutch, one person remains inside. Put hutch key in SRU and turn.

The Safety Shutter "enable" light does not come on until the end of the warning interval

6. The person inside presses the Emergency Stop Button.

The shutter "enable" light goes out

The ES indicator comes on

The ES latch cannot be reset unless the SOR key is turned

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7. Place latch device on door lock so key can be removed. Place switch holders on door switches. Search hutch, put door key in SRU and turn, open safety shutter and photon shutter.  
The "Beam On" sign turns ON \_\_\_\_\_

<b>Door:</b>	
<b>1</b>	<b>2</b>

Remove holder from switch 2.

RIB latch light comes on \_\_\_\_\_

8. Replace holder on switch 2.

RIB cannot be reset unless SOR key is turned. \_\_\_\_\_

9. Remove holder on switch 1.

Safety shutter closes \_\_\_\_\_

Photon shutter closes \_\_\_\_\_

RIA latch light comes on \_\_\_\_\_

Hutch interlock drops out \_\_\_\_\_

"Beam On" sign goes out \_\_\_\_\_

RIA can't be reset w/o SOR \_\_\_\_\_

10. Replace holder on switch 1. Search hutch, leave shutter closed.

Hutch Kirk key (KKH) cannot be removed from SRU unless button is pushed \_\_\_\_\_

11. Open safety shutter and photon shutter (if equipped).

KKH cannot be removed even if button is pushed \_\_\_\_\_

12. Close shutters. Turn KKH and note where solenoid unit stops rotation. Push the button and turn key just beyond this point, but not far enough to actuate "key removed" switch. Release the button and leave key in this position. Open shutter(s), remove KKH, and replace.

RIA latch light comes on \_\_\_\_\_

RIB latch light comes on \_\_\_\_\_

The safety shutter closes \_\_\_\_\_

The photon shutter closes \_\_\_\_\_

13. With hutch interlocked, leave shutter(s) closed.

Beam line transfer key can be removed only if button on SRU is pushed \_\_\_\_\_

Open safety shutter. (Photon shutter remains closed)

Beam line transfer key can't be removed even if button is pushed \_\_\_\_\_

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14. Close safety shutter. "Cheat" SRU as described in step 12. Open safety shutter, remove the key and replace.

RIA latch light comes on \_\_\_\_\_

RIB latch light comes on \_\_\_\_\_

The safety shutter closes \_\_\_\_\_

SPA comes on \_\_\_\_\_

SPA can't be reset w/o SOR \_\_\_\_\_

Reset RIA and RIB

15. Dump hutch interlock (if not already done so). Close photon shutter. Cheat "Beam Plug" SRU key.

Open safety shutter, remove beam plug key, and replace.

RIA latch light comes on \_\_\_\_\_

Safety Shutter Closes \_\_\_\_\_

Reset RIA

**Important:** Remove all door switch holders before the next step.

16. Open safety shutter. Hutch remains not interlocked.  
Disconnect plug cable from one end.

RIB latch light comes on \_\_\_\_\_

Safety Shutter Closes \_\_\_\_\_

Reconnect the plug cable and then open the safety shutter.

Disconnect plug at the other end.

RIB latch light comes on \_\_\_\_\_

Safety Shutter Closes \_\_\_\_\_

Reconnect the plug cable.

Replace switch holders on door switches.

17. Open photon and safety shutter. Press an emergency stop button.

RIA latch light comes on \_\_\_\_\_

RIB latch light comes on \_\_\_\_\_

Hutch interlock drops out \_\_\_\_\_

ES indicator comes on \_\_\_\_\_

Safety Shutter Closes \_\_\_\_\_

Photon Shutter Closes \_\_\_\_\_

18. Observe the photon shutter while it is opened and closed.

The mechanism moves freely and without hesitation \_\_\_\_\_

19. Open the safety shutter. Remove the Control Room Shutter Enable Key for this beam line, then replace the key.

The safety shutter closes \_\_\_\_\_

RIA latch light comes on \_\_\_\_\_

The "Control Room Shutter Enable" light goes out \_\_\_\_\_

The SPA latch comes on (after the key is back on) \_\_\_\_\_

The safety shutter cannot be opened \_\_\_\_\_

Reset RIA and SPA

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20. Open the Safety Shutter.  
At the Control Room Operator's Console, switch the shutter master enable to "Inhibit" and back to "Enable". (Note: No auto open switch at beamline)
- The safety shutter closes \_\_\_\_\_  
And then re-opens \_\_\_\_\_
21. One person goes to the x-ray equipment area and resets the indicators for RIAX and RIBX at SR100.  
Open the safety shutter and photon shutter (if equipped).  
Remove switch holder from door switch number 2.
- RIB latch light comes on \_\_\_\_\_  
RIBX "Loop Enabled" indicator goes out \_\_\_\_\_  
RIBX "Loop Disabled" indicator comes on \_\_\_\_\_
- Replace switch holder.
- RIBX cannot be reset \_\_\_\_\_
- Reset RIB
- RIBX CAN be reset \_\_\_\_\_  
("Loop Enabled" indicator comes on) \_\_\_\_\_
22. Remove holder from door switch 1.
- RIA latch light comes on \_\_\_\_\_  
RIAX "Loop Enabled" indicator goes out \_\_\_\_\_  
RIAX "Loop Disabled" indicator comes on \_\_\_\_\_  
The safety shutter closes \_\_\_\_\_  
The photon shutter closes \_\_\_\_\_  
RIAX cannot be reset \_\_\_\_\_
- Reset RIA
- RIAX CAN be reset \_\_\_\_\_  
("Loop Enabled" indicator comes on) \_\_\_\_\_
23. Remove the holders from the switches. Remove the latch device from the door lock(s). Stand inside the hutch and open and close the door.
- All door switches operate freely and each makes a "click" when door is opened \_\_\_\_\_  
(Complete test for each set of door switches) \_\_\_\_\_
- | Door: |   |
|-------|---|
| 1     | 2 |
24. Search the hutch. Locate the safety shutter associated with the beam line by tracing the beam pipe through the shield wall. Do not rely on labels on the shutter mechanism. Open the shutter.
- The correct shutter opens \_\_\_\_\_  
No other shutter at that saw tooth opens or attempts to open \_\_\_\_\_
- Close the safety shutter.
- The mechanism moves freely and without hesitation \_\_\_\_\_

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